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Fruit Weed Control Tactics

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CMREC , Upper Marlboro

Southern Maryland Fruit Team
CMREC, Upper Marlboro
Dave Myers
Ben Beale
Herb Reed
Joe Fiola
Chris Walsh

Vineyard Team


ONEAL
Educating People
To Help Themsel

Tell me more about herbicides!

Photo Courtesy of PSU

The Herbicide Rights

Right Material

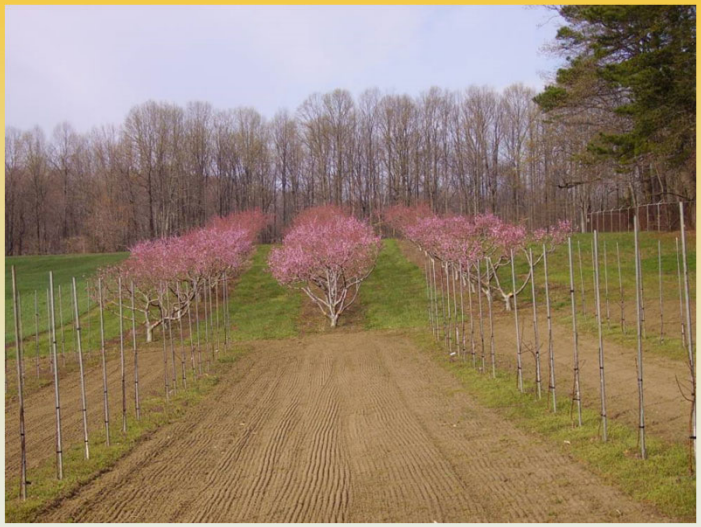
Right Rate

Right Timing

Right Placement

Right Weather

……a lot to get right!



HRAC & WSSA [#]

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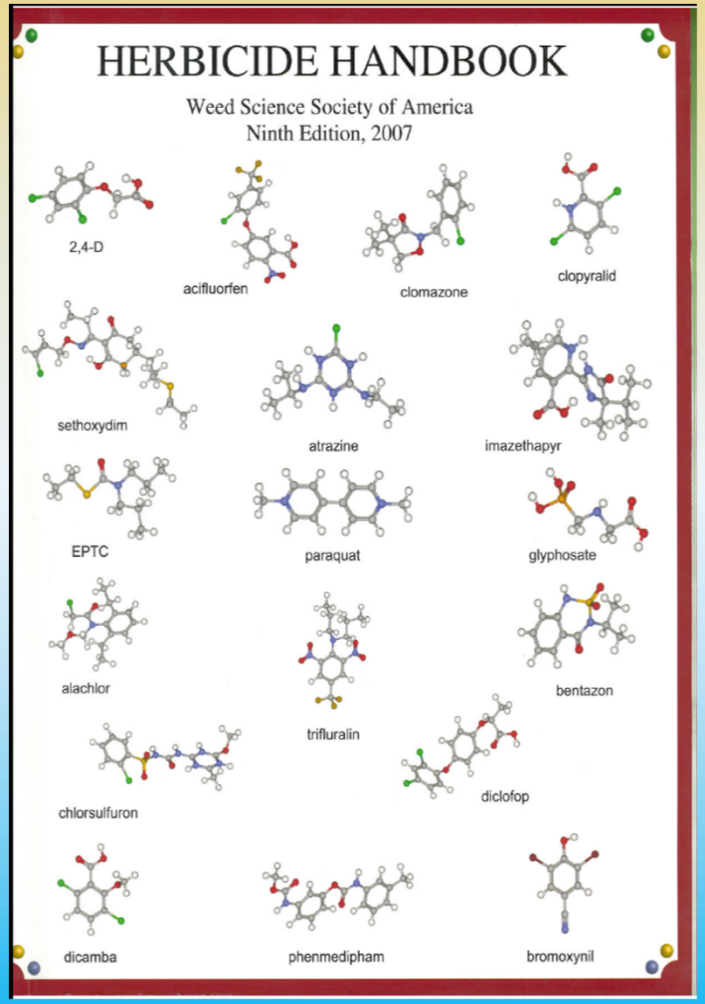

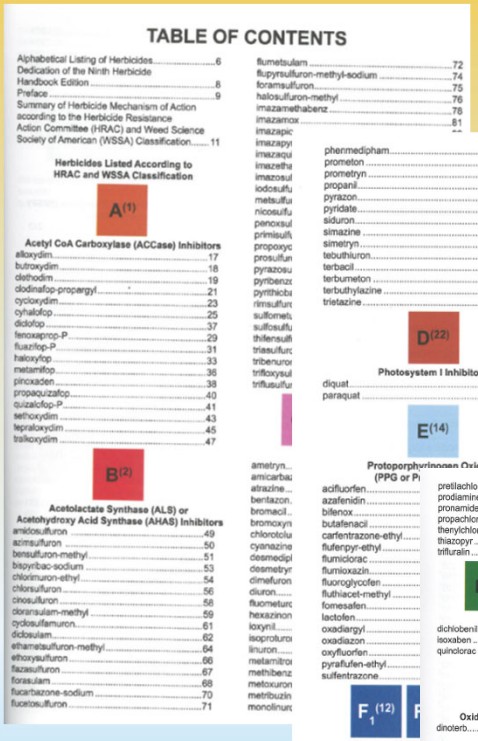

Burndown? Pre-Emergence? Post-Emergence?

- Burndown is the control off existing weeds or cover crops. Adequate weed and cover crop burndown is very dependent on temperature and humidity at time of application.

- Pre-Emergence control means herbicide is applied and has formed a soil barrier prior to weed seed germination. Often applied with a burndown herbicide.

- Post-Emergence control means selectively spraying young actively growing weeds that are less than 6 inches tall; 3 to 4 inches is best. Often applied alone for best results.

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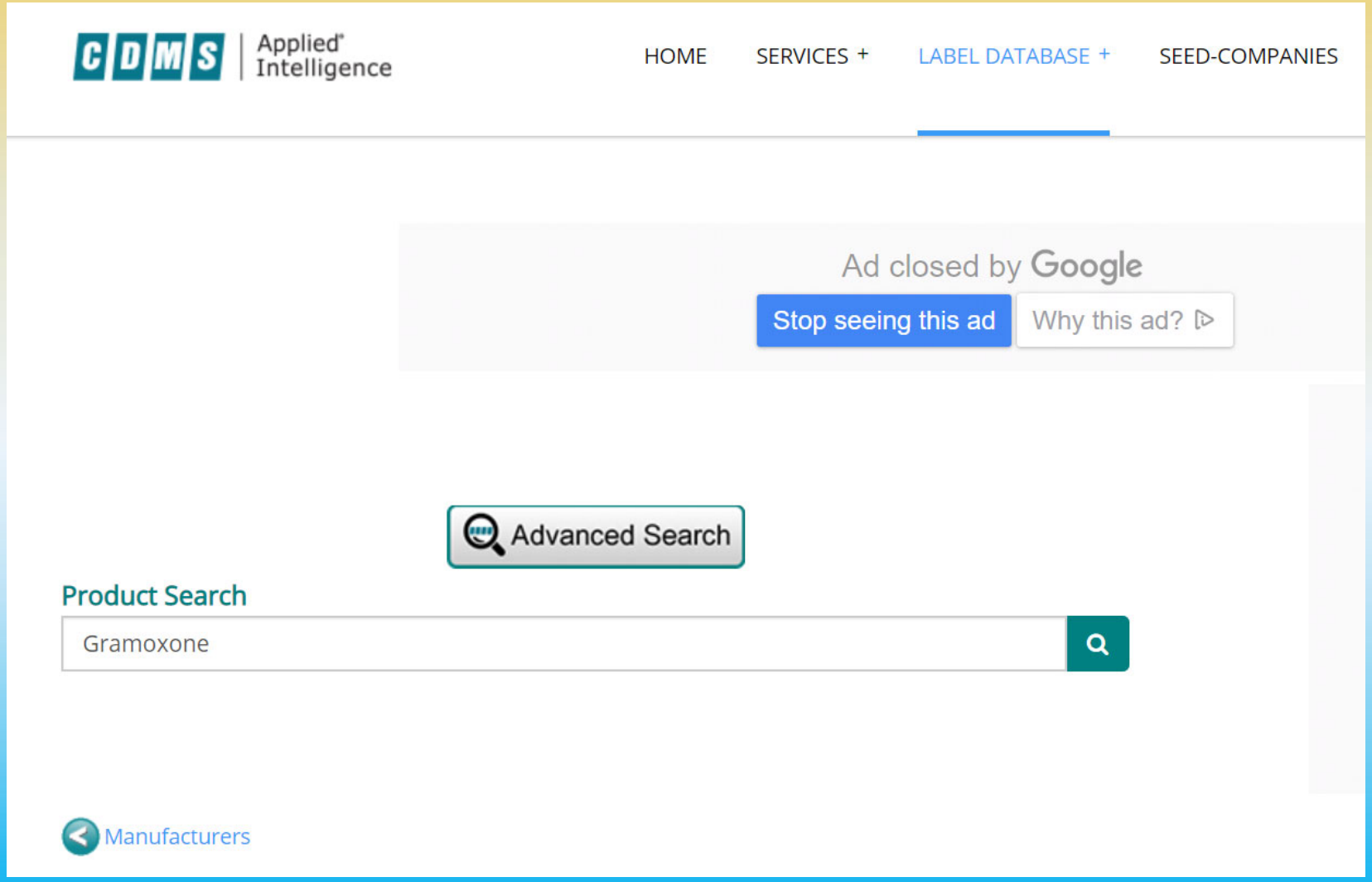
Common Fruit Herbicides*

Herbicide	Low Rate	HRAC	Application Timing and Activity	Koc ml/g	Water Solubility mg/L	Soil Half-Life Avg Days	Application Notes
Gramoxone paraquat	1.0 qts	22	Burndown	1,000,000	620,000	1000	Directed Spray, Latex Trunks, Wraps 1-3 Years
Roundup glyphosate	1.0 qts	9	Burndown	24,000	15,700	47	Shielded, Directed Spray, Latex Trunks, Wraps 1-3 Years
Rely glufosinate	22.0 ozs	10	Burndown	100	1,370,000	7	Shielded, Directed Spray, Latex Trunks, Wraps 1-3 Years
Devrinol napropamide	4.0 lbs	15	Preemerge	700	73	70	Spring, Early Summer, 35-day PHI
Surflan oryzalin	2.0 qts	3	Preemerge	600	2.6	20	Spring or Summer, Surflan 0-day PHI
Prowl pendimethalin	2.0 qts	3	Preemerge	17,200	0.275	44	Spring, Prowl 60-day PHI
Karmax diuoron	1.0 lbs	7	Preemerge	480	42	90	Fall or Spring Dormant, 3-yr Established
Sinbar terbacil	4.0 ozs	5	Preemerge	55	710	120	Fall Dormant, 1-yr Established
Kerb pronamide	2.0 lbs	15	Preemerge	840	15	35	Fall Dormant, 1-yr Established
Princep simazine	1.0 qts	5	Preemerge	130	2	80	Spring Dormant, Avoid >7 pH Soils, 3-yr Established
Alion indazaflam	3.5 ozs	29	Preemerge	496	dispersible	---	Fall or Spring Dormant, Directed Spray, 3-yr Established
Casoron dichlobenil	100 lbs	20	Preemerge	---	dispersible	---	Granular Applied Incorporated, 4-weeks Post Transplanting
Solicam norflurazon	2.5 lbs	12	Pre & Post	700	28	112	Spring or Fall, 1-yr Established
Chateau flumioxazin	12.0 ozs	14	Pre & Post	---	1.79	14	Broadleaves, After Harvest to Bud Swell
Goal oxyfluorfen	1.0 qts	14	Pre & Post	100,000	0.1	30	Broadleaves, After Harvest to Bud Swell
2,4-D	1.0 qts	4	Pre & Post	62	---	14	Dormant Only, Avoid Temps Above 85° for 3-Days
Matrix rimsulfuron	4.0 ozs	2	Pre & Post	---	7300	2	Spring, 1-Yr Established, Mixed Weeds
Zeus Prime XC sulfentrazone + carfentrazone	7.5 ozs	14	Pre & Post	mobile	dispersible	---	Shielded Spray, 3-14 day PHI, Avoid >7 pH soil, 2-yr Established
Aim carfentrazone	2.0 ozs	14	Post	750	12,000	0.1	Broadleaves, Directed Spray, 0-3-day PHI
Venue pyraflufen	2.0 ozs	14	Post	2090	0.5	3	Broadleaves, Directed Spray, 0-3-day PHI

*** Consult label for specific fruit applications.**

R. D. Myers 2022

Labels and SDS at CDMS.net



Herbicide Mode of Action & Classification

- Cell Membrane Disrupters

  Bipyridiliums **[22]**

  Paraquat: Gramoxone Inteon®

  Directed Spray, Restricted Use - Danger

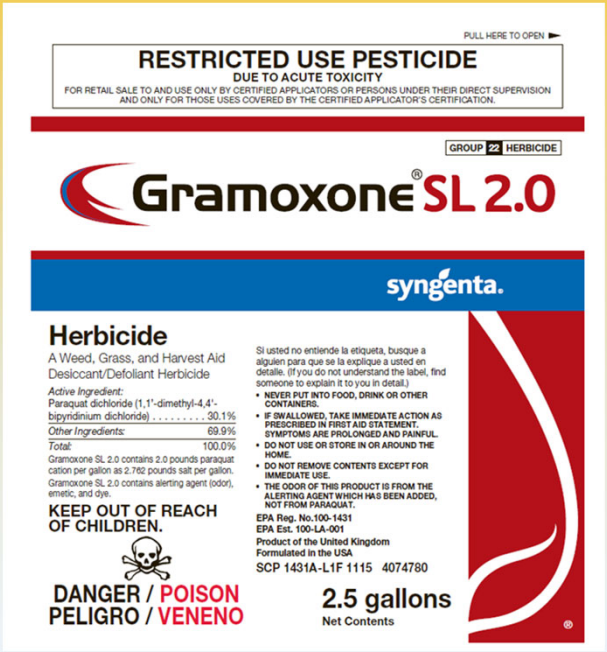
  ✓Post-emergence with no soil activity or uptake

  ✓Non-selective

  ✓Contact herbicide: rapid foliar absorption with some translocation

  ✓Use with a non-ionic surfactant (NIS)

  ✓*New* Label Restrictions!



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Welcome to the How To Safely Use and Handle Paraquat-Containing Products

Successful completion of this course satisfies the paraquat training requirement mandated by the U.S. Environmental Protection Agency (EPA) for all certified applicators who intend to apply paraquat. *"In accordance with EPA's 2016 Paraquat Dichloride Human Health Mitigation Decision, applicators are required to take an EPA-approved paraquat training program every 3 years in order to **mix, load, apply, or handle paraquat**."*

You should expect to spend about 45 minutes going through this training. It may take longer if you go back and review parts of the training. If you need to leave the training before you are finished, when you return, you should resume from the place you left.

Once you have finished reviewing the material, you will need to take the Final Assessment. You must correctly answer all questions in order to pass the test and receive your certificate. You can take the test as many times as you need to in order to pass. Be sure to print and retain your certificate when you are finished.

If you have questions regarding the requirements, please contact Patsy Laird, USGR at patsy.laird@syngenta.com

Take the Final Assessment

Once you've completed the course, you must take this quiz. You need to receive100% before you can print your certificate. You may take the review the course and take the quiz as many times as you need to receive the 100%.

Final Assessment

Not attempted

After you finish the course above, this final assessment will be available to you. You must receive 100% in this assessment to finish the mandated requirements.

After receiving 100% in the assessment, you may print your certificate below.

Print Your Certificate

Once you receive 100% in the quiz above, you will be able to print your certificate.

Thank you for taking the time to complete this important and mandatory Paraquat Training.

Certificate of Completion

Restricted Not available unless: You achieve a required score in **Final Assessment**

USDA / NIFA

This work is supported by the USDA National Institute of Food and Agriculture, New Technologies for Ag Extension project.

Certificate of Completion

This is to certify that

Ronald Myers

has completed the course

How To Safely Use and Handle Paraquat-Containing Products

Paraquat Training Required by the U.S. Environmental Protection Agency

Herbicide Mode of Action & Classification

- Aromatic Amino-Acid 5 Enolpyruvyl-Shikimate-3-Phosphate Synthase (EPSP) Inhibitors

  <u>Organophosphorus</u> [9]

  Glyphosate: Roundup Weather Max® *7+ Roundup formulations* **or Touchdown ® or Credit® or Rattler® [9]**

  Shielded Spray Only!

  - ✓Post-emergence with no soil activity or uptake.
  - ✓Non-selective.
  - ✓Contact systemic herbicide: foliar absorption with translocation.
  - ✓Do not use with a surfactant – see label.
  - ✓Generic 4L glyphosate formulations are less likely to cause injury.
  - ✓Avoid trunk, cane, fruit, branch & bud contact.

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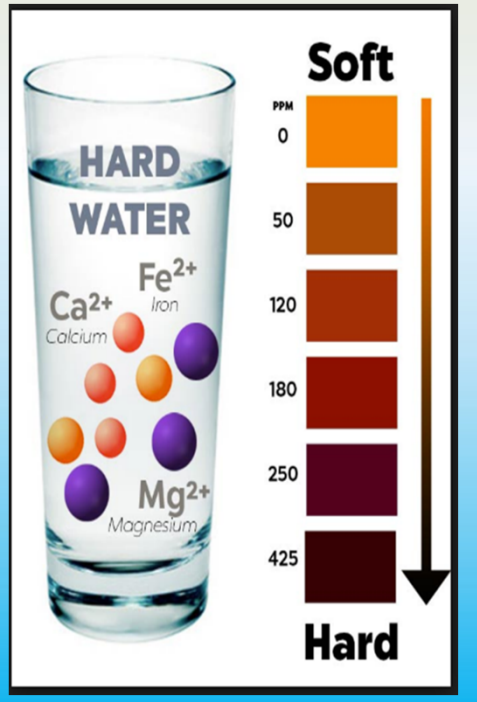
Adding ammonium sulfate (AMS) to the spray tank overcomes adverse effects of hard water. The ammonium cation preferentially attaches to the glyphosate molecule and thus prevents Ca, Mg, Fe, or Na from doing so. When ammonium is attached, the molecule binds readily to EPSP synthase and the herbicide functions normally.

The jar on the left shows glyphosate dissolving in distilled water. The jar on the right shows glyphosate binding with minerals in hard water. Glyphosate bound to hard water minerals is ineffective as a herbicide. Chemical incompatibilities such as these are not always visible.



Making Herbicides Work?

Follow the Label.

- Key weeds are on the Label.
- Use Required Surfactant, AMS, MSO, COC, NIS etc…
- Rainfast requirement for post-emergence herbicides.
- Tank mix partners and fertilizers.

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W.A.M.L.E.G.S. - Mixing order for tank mixes

W. Wettable powders, flowable (DC, DF, DG, DS, F, DF, Gr, SG, SP)

A. Agitate, Anti-flowing compounds, buffers

M. Microcapsule suspension (ME)

L. Liquid and soluble (SN, SC, Li, Su)

E. Emulsifiable concentrates (EC)

G. High load Glyphosates

S. Surfactants

When in doubt, consult the label

Concept: BASF

An example of physical incompatibility in the sprayer tank. Photo Credit – Dr. J. Reiss, Illinois.

Physical: When two or more pesticides are mixed and they form a precipitate or unsprayable mixture. To prevent this from occurring do a jar test.

Herbicide added to fertilizer first.

Herbicide added to water first.

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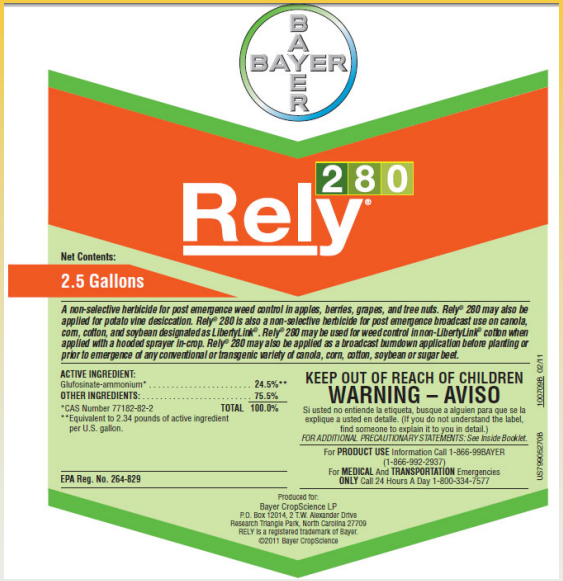
Herbicide Mode of Action & Classification

- Glutamine Synthesis Inhibitor

  <u>Organophosphorus</u>

  Glufosinate: Rely® [10]



  Lower dermal LD_{50} then oral LD_{50}

  - ✓Post-emergence with no soil activity or uptake.
  - ✓ Degrades rapidly in the soil, 7-days by soil microbes.
  - ✓Non-selective contact herbicide: foliar absorption with limited translocation.
  - ✓Use with Ammonium Sulfate,
  - ✓No additional surfactant.
  - ✓Directed Spray - Avoid trunk, cane, fruit, branch & bud contact.

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Spray Program for Multi-Tree Fruit Orchards

Many local orchards are composed of multi-fruit combinations producing for fresh market apples, peaches, pears, plums, nectarines, and cherries. Aggressive fruit tree spray programs are required to achieve high quality fruit. These multi-fruit orchards create many spray management challenges for the achievement of good pest control in accordance to label guidelines.

Therefore, the following multi-fruit orchard spray program for the control of major tree fruit pests and diseases may offer some assistance: **Labeled as noted in 2022 for All Tree Fruit – Pomes: Apples & Pears Stones: Peaches, Plums, Nectarines, and Cherries.**

FUNGICIDES: [FRAC]	*RATE	NOTES
Captan® 80WDG [M4] (Not Labeled for Pears; Reduce Rates for Cherries)	3-5.0 lbs	General Protectant
Dormant Oil [NC]	4.0 gal	Apply Temp 35-85° F
Kocide® DF [M1] (Stones: Dormant Spray Only)	6.0 lbs	Other Fixed Coppers
Rally®40W [3]	4.0 ozs	Powdery Mildew
Sulfur 95W [M2]	3.0 lbs	General Protectant
Gem® 500 SC [11] (Stones Only) **or**	3.0 ozs	Brown Rot & Peach Scab
Adamant® 50WG [3/11] (Stones Except Plums)	6.0 ozs	Brown Rot, Peach Scab & Powdery Mildew
Pristine® [7/11] or (Limited to 4 Sprays/Season With Only 2 Consecutively)	14.5 ozs	Brown Rot, Powdery Mildew, Scab, Rusts & Fruit Spots
Indar® 2F [3]	6.0 ozs	Powdery Mildew & Rusts
Topsin-M® 70W [1]	8.0 ozs	General Protectant
Ziram 76DF [M3] (Captan Substitute for Pears)	5.0 lbs	Dormant Peach Leaf Curl General Protectant
Agrimycin® 17 W (Apples & Pears Only)	24.0 ozs	Fireblight Control
Ph-D® WDG [19] (Not labeled for stones)	6.2 ozs	Powdery Mildew & Scab

INSECTICIDES: [IRAC]	*RATE	NOTES
Imidan® 70W [1A]	2.0 lbs	Curculio, SWD, Scale & Fruit Moths
Warrior® [3] **or Tombstone® [3]**	4.0 ozs 2.0 ozs	Borers, Curculio, SWD, BSMB & Fruit Moths
Besiege [3/28]	6.0 ozs	Peachtree Borer, SWD, Aphids, Curculio, Fruit Moths & Thrips
Actara® [4A]	4.5 ozs	Aphids & Curculio
Acramite® 50WS [25]	1.0 lbs	Mites Only as Required
Sevin® 50W [1A] (Apple Thinning Agent)	4.0 lbs	SWD, Japanese Beetles, Hornets & Sap Beetles

*Rate for 50-100gal Acre Concentrate Spray

**Be sure to follow all labels closely for PHI and REI!

Multi-Fruit Spray Calendar*

March 15 - Dormant Spray
Dormant Oil 4.0 gal (Scales & Mites)
Kocide® DF 6.0 lbs

April 5 - Peach Bloom
Apple Tight Cluster
Captan® 80WDG 3.0 lbs

April 15 - Peach Petal Fall
Apple Bloom
Captan® 50W 3.0 lbs
Indar® 2F 6.0 ozs
Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)

April 25 - Peach Shuck Split
Apple Petal Fall
Pristine® 14.5 ozs
Warrior® 4.0 ozs (Curculio)
Agrimycin® 17 W 24.0 ozs (Fireblight Control Add for Apples & Pears Only)

May 5 - 1st Cover Spray
Captan® 80WDG 4.0 lbs (Cedar Apple Rust - Higher Rates for Wetter Conditions)
Indar® 2F 6.0 ozs (Powdery Mildew & Rusts)
Actara® 4.5 ozs (Curculio & Aphids; PHI: 35-Days Pomes, 14-Days Stones)

May 15 - 2nd Cover Spray
Captan® 80WDG 3-4.0 lbs
Rally® 40W 4.0 ozs (Peach Rusty Spot Only)
Warrior® 4.0 ozs (Curculio; PHI 21-Days Pomes, 14-days Stones)

June 1 - 3rd Cover Spray
Captan® 80WDG 3-4.0 lbs
Topsin-M® 70W 8.0 ozs(Apple Sca
Imidan® 70W 2.0 lbs (Curculio, Sc
PHI: 7-Days Pomes, 14-Days
Acramite® 50WS 1.0 lbs (For Mites
7-Days Pomes, 3-Days Stones

June 15 - 4th Cover Sp
Captan® 80WDG 3-
Sulfur 95W 3.0 lbs (0-day PHI);
Tombstone® 2.0 ozs (Borers, Curc
7-day PHI)

July 1- 5th Cover Spray
Early Peach Harvest
Captan® 80WDG 3-4.0 lbs (0-day
Pristine® 14.5 ozs (Early Stones 0-
4 Sprays/Season With Only 2
Tombstone® 2.0 ozs (Borers, Curc
7-Day PHI)

July 15 - 6th Cover Spray
Peach Harvests
Captan® 80WDG 3-4.0 lbs (0-day PHI; 1-day REI)
Rally® 40W 4.0 ozs(0-dayPHI, except apples 14-days)
Sevin® 50W 4.0 lbs (Japanese Beetle & Moths – 5-Day PHI for All Fruit)

August 1- 7th Cover Spray
Peach Harvests
Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI); **or**
Pristine® 14.5 ozs (Early Pomes 0-day PHI)
Sevin® 50W 4.0 lbs (Japanese Beetle & Hornets – 5-Day PHI for All Fruit)

August 15 - 8th Cover Spray
Early Apple Harvests
Late Peach Harvest
Captan® 80WDG 4.0 lbs (0-day PHI; 1-day REI); **or**
Pristine® 14.5 ozs (Pomes 0-day PHI)

September 1 - 9th Cover Spray

Spray Program for Multi-Tree Fruit Orchards

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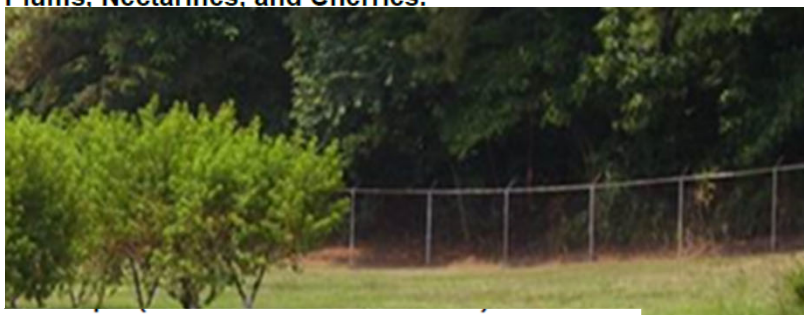

HERBICIDES: [HRAC]	*RATE	NOTES
Gramoxone ® [22]	1.0 qts	Burndown, Directed Spray
Roundup ® [9]	1.0 qts	Burndown, Shielded & Directed Spray
Devrinol ® 50 DF [15]	4.0 lbs	Spring/Summer 35-day PHI
Princep ® 4L [5]	1.0 qts	Spring Dormant, Avoid High pH Soils
Solicam® [12]	2.5 lbs	Spring/Fall Dormant, 1-yr Established
Goal ® or Galigan® [14]	2.0 pts	After Harvest to Spring Bud Swell
Chateau [14]	12.0 ozs	After Harvest to Spring Bud Swell
Aim®, Shark® or Venue [14]	2.0 ozs	Directed Spray, 0-3-day PHI
Matrix ® [2]	4.0 ozs	Late Spring, 1-yr Established
Prowl ® [3] or Surflan® [3]	2.0 qts	Spring/ Summer, Prowl 60-day PHI
Poast® [1]	1.5 pts	Summer Grasses, Variable PHI
Karmex ® [7] or Diuron® [7]	1.6 qts	Spring/Fall Dormant, 3-yr Established

***Lowest Use Rate Recommended Initially**

* Important Note: The calendar spray dates given are an average estimate for Anne Arundel and Prince George's County Orchards, and may vary by location in Maryland. Be sure to adjust your spray schedule application dates accordingly. The above recommendations very closely reflect the current spray program utilized at the University of Maryland Research and Education Center, Upper Marlboro Facility for its research orchards. Remember to always "Read the Label

R. David Myers
Principal Agent, Agriculture
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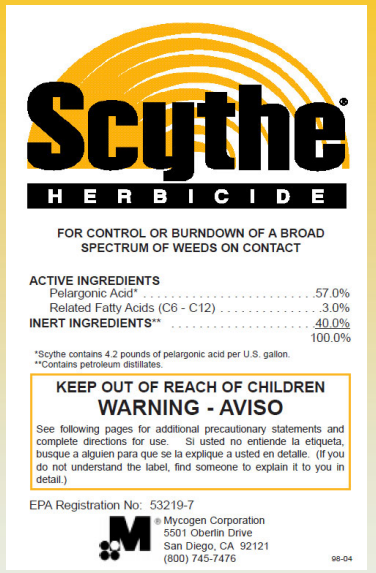
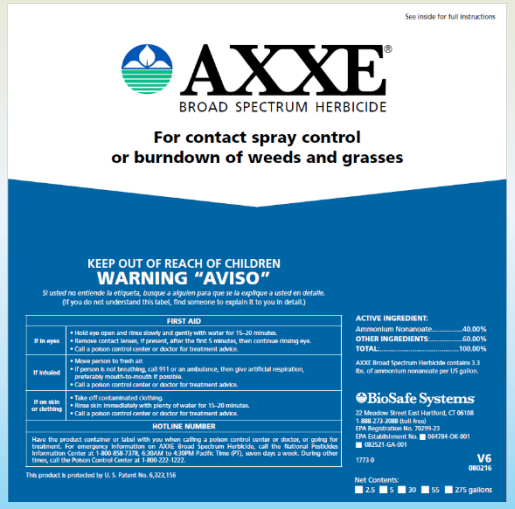
Organic Approach Substitutions:

Conventional Product	Organic Certified Product (OMRI)
Captan® & Topsin-M®	Surround® or Sulfur or Lime Sulfur
Rally®	Kaligreen® (Powdery Mildew Eradicant)
Listed Insecticides	Neem® or Pyganic® or Entrust® (Stone Fruits Only)
Agrimycin®	Agrimycin® or Fixed Copper (Apples & Pears Except During Bloom)
Gramoxone® or Roundup®	Avenger® or Burnout®or AXXE®/BioSafe® or (Scythe® no OMRI label)





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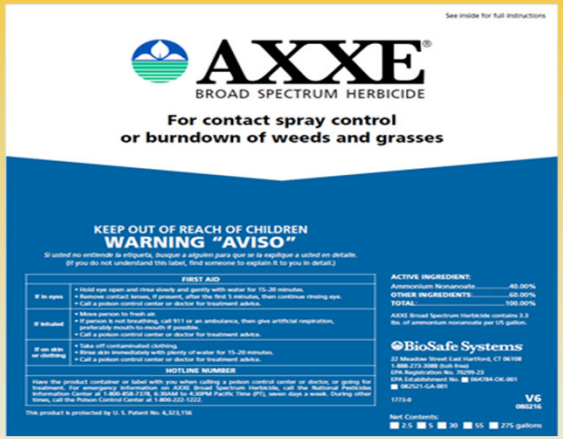
Herbicide Mode of Action & Classification

- Cell Membrane Disrupters

  <u>Nonaonic acid</u>

  Pelargonic Acid: AXXE® [27]



Directed spray (Organic Label)

- ✓Post-emergence with no soil activity or uptake.
- ✓Non-selective. Apply to point of drip.
- ✓Contact herbicide: rapid foliar absorption, non-systemic.
- ✓30-120 gals/acre spray solution of 6%-15% AXXE®.

<u>10-gallon spray mixtures:</u>

6% Solution – 2.5 qts. AXXE® + water.

8% Solution – 3.25 qts. AXXE® + water.

10% Solution – 4.0 qts. AXXE® + water.

15% solution – 6.0 qts. AXXE® + water.

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Fast Acting
AVENGER
WEED KILLER
CONCENTRATE
OMRI Listed
FOR ORGANIC GARDENING
Non-Selective: Controls most weeds, grasses & broadleaves
• Made from Oranges • Contains Citrus Oil • Clean Citrus Scent • Does not stain brick, concrete or pavement • Can Be Used Around Pets/Wildlife After Spray Has Dried
KEEP OUT OF REACH OF CHILDREN
CAUTION See back panel for additional Precautionary Statements and First Aid
ACTIVE INGREDIENT: d-limonene (citrus oil) 70%
INERT INGREDIENTS 30%
Total 100%
Patented Formula
Net Contents: 32 FL OZ (946 mL)

CONCENTRATE
AVENGER WEED KILLER
PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION: Harmful if absorbed throughskin. Causes moderate eye irritation. Avoid contact with skin, eyes or clothing.

FIRST AID

If on Skin or Clothing:	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If in Eyes:	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lens, if present, after the first 5 minutes. Then continue rinsing eye. • Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment.

Personal Protective Equipment (PPE): Applicators and other handlers must wear:
• Long sleeved shirt and pants • Shoes plus socks • Protective eyewear.
Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations
User should:
• Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet
• Remove clothing immediately if product gets inside. Then wash thoroughly and put on clean clothing.

PHYSICAL AND CHEMICAL HAZARDS: Combustible. Do not use or store near heat or open flame.
ENVIRONMENTAL HAZARDS: Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.
DIRECTIONS FOR USE: It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.
Manufactured by: Cutting Edge Formulations, Inc.
3057 Summer Oak Place, Buford, Georgia 30518
(866) 906-WEED www.AvengerWeedKiller.com

TRUSTED SINCE 1926
BONIDE
BurnOut®
Fast acting weed and grass killer
see results in less than an hour
for non-selective control of herbacious broadleaf and grassy weeds
FOR ORGANIC GARDENING
People & Pet Safe
when used as directed
ACTIVE INGREDIENTS:
Citric Acid..... 24.0%
Clove Oil..... 8.0%
INERT INGREDIENTS*..... 68.0%
TOTAL..... 100.0%
*Inert Ingredients: Water, Lauric Acid, Octanoic Acid, Gum Arabic, Xanthan Gum, Sodium Acetate
Keep Out Of Reach Of Children
DANGER See back panel for additional Precautionary Statements and First Aid

Scythe®
HERBICIDE
FOR CONTROL OR BURNDOWN OF A BROAD SPECTRUM OF WEEDS ON CONTACT

ACTIVE INGREDIENTS	
Pelargonic Acid*	57.0%
Related Fatty Acids (C6 - C12)	3.0%
INERT INGREDIENTS**	40.0%
	100.0%

*Scythe contains 4.2 pounds of pelargonic acid per U.S. gallon.
**Contains petroleum distillates.

KEEP OUT OF REACH OF CHILDREN
WARNING - AVISO
See following pages for additional precautionary statements and complete directions for use. Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

EPA Registration No: 53219-7
® Mycogen Corporation
5501 Oberlin Drive
San Diego, CA 92121
(800) 745-7476
98-04

AXXE®
BROAD SPECTRUM HERBICIDE
SPECIMEN LABEL

Herbicide Mode of Action & Classification

- Meristematic Root Inhibitors: Inhibition of Cell Division and Elongation of Roots

  <u>Dinitroanalines</u> **[3]**

  Pendimethalin: Pendimax® or Prowl® *New H2O formulation*

  60 day PHI

  Oryzalin: Surflan® A.S.

  0 day PHI

  Trifluralin: Treflan® or Trilin®

  - ✓Pre-emergence with 1-3 months of soil activity
  - ✓Does not leach – forms a herbicide barrier in clay soils
  - ✓Apply before rainfall or shallowly incorporate
  - ✓Controls grasses & small seeded broadleaves
  - ✓Not translocated in plants

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Agriculture & Food Systems

Herbicide Mode of Action & Classification

- Mobile Photosynthetic Inhibitors

<u>Ureas</u>

Diuron: Karmex® or Diuron® [7]

Orchards and Vineyards

- ✓Pre and Post-emergence with 4-12 months of soil activity
- ✓Controls broadleaves & grasses
- ✓Absorbed primarily through the roots translocated readily via the xylem
- ✓Some foliar uptake
- ✓3-year established Vineyards & Orchards.
- ✓Dormant application in Fall or Spring.

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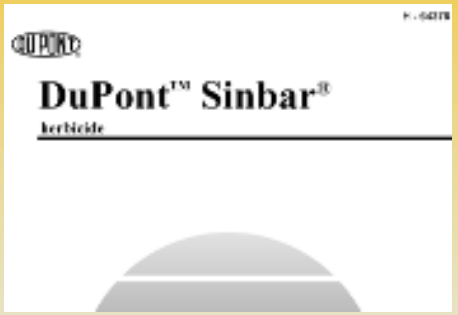
Herbicide Mode of Action & Classification

- Mobile Photosynthetic Inhibitors

  <u>Uracils</u>

  Terbacil: Sinbar® [5]

  All Fruit – 70-110 Day PHI



  - ✓Pre and Post-emergence with 4-12 months of soil activity
  - ✓Controls broadleaves & grasses
  - ✓Absorbed primarily through the roots translocated readily via the xylem
  - ✓Some foliar uptake
  - ✓Applied to Strawberries at renovation.
  - ✓1-year established fruit.
  - ✓Dormant application in Fall or Spring.

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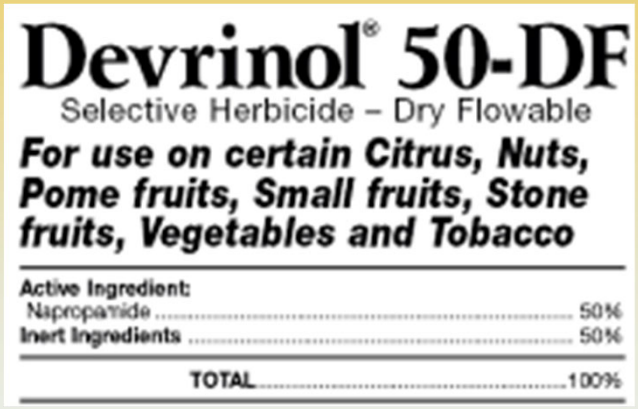
Herbicide Mode of Action & Classification

- Meristematic Shoot Inhibitors: Strong Inhibiter of Mitosis - Cell Division



Chloracetamides or Amides **[15]**

Napropamide: Devrinol®

Safe for all fruit!

Pre-emergence with 1-3 months of soil activity.

- ✓Very little leaching – forms a herbicide barrier in clay soils.
- ✓Apply before rainfall or shallowly incorporate.
- ✓Controls primarily grasses & small seeded broadleaves.
- ✓Absorbed primarily by the roots and readily translocated via the xylem.
- ✓**For Annual Strawberries apply over raised bed prior to laying plastic.**

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ONEAL
COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF MARYLAND SYSTEM
Educating People

Herbicide Mode of Action & Classification

- Meristematic Shoot Inhibitors: Strong Inhibiter of Mitosis - Cell Division

Chloracetamides or Amides [15]

Pronamide: Kerb®

Pre & Post-emergence with 1-3 months of soil activity

- ✓Apply Fall Dormant.
- ✓Very little leaching – forms a herbicide barrier in clay soils
- ✓Apply before rainfall or shallowly incorporate
- ✓Controls primarily grasses & small seeded broadleaves
- ✓Absorbed primarily by the roots and readily translocated via the xylem
- ✓1-year Established Brambles and Blueberries
- ✓Apply post harvest to 1-year old Vineyards & Orchards

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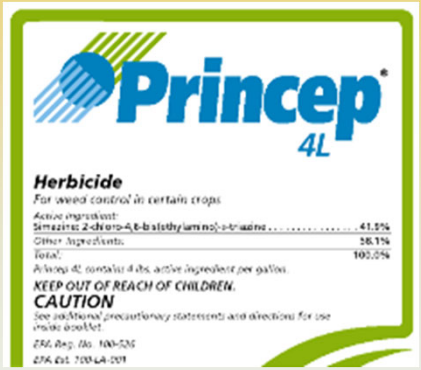
Herbicide Mode of Action & Classification

- Mobile Photosynthetic Inhibitors

  Triazines [5]

  Metribuzine: Sencor ® **(Peaches Only)**



  Simazine: Princep®

  3-Year Old Vineyards & Established Orchards, Blueberries and Brambles

  - ✓Pre and Post-emergence with 2-6 months of soil activity
  - ✓Apply when dormant - Controls broadleaves & grasses
  - ✓Absorbed primarily through the roots translocated readily via the xylem
  - ✓Some foliar uptake
  - ✓Avoid application on high pH soils above 6.8
  - ✓*Use low rate!*

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Herbicide Mode of Action & Classification

- Carotenoid Synthesis Inhibitors

  <u>Pyridazinone</u>

  Norflurazon: Solicam® [12]

2-year established Vineyards and Orchards Blueberries and brambles.

- ✓Preemergence with 1- 6 months of soil activity
- ✓Controls grasses, sedges and many broadleaves
- ✓Absorbed primarily through the roots translocated readily via the xylem
- ✓Half low rate – Dormant or in fall post harvest

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Herbicide Mode of Action & Classification

- PPG or Protox Inhibitor

  <u>Diphenylethers</u> **[14]**

  Oxyflurofen: Goal® or Galigan®

  or Fire Power®

  - ✓Pre & Post-emergence with 1 month of soil activity or uptake.
  - ✓Controls broadleaves, assists in grass control preemergence.
  - ✓Contact herbicide: Foliar with shoot & some root uptake from the soil – non mobile in plant.
  - ✓Use with a non-ionic surfactant (NIS).
  - ✓Dormant Orchard applications only.

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Herbicide Mode of Action & Classification

- PPG or Protox Inhibitor

  N-Phenylphthalimides **[14]**

Flumioxazin: Chataeu®

1-year established & 60-day PHI for Vineyards and Orchards.

- ✓Pre & Post-emergence with 1 month of soil activity or uptake.
- ✓Controls broadleaves, assists in grass control preemergence.
- ✓Contact herbicide: Foliar with shoot & some root uptake from the soil – non mobile in plant.
- ✓Use with a non-ionic surfactant (NIS).
- ✓Hooded sprayer unless dormant in Orchards.
- ✓Strawberries and Blueberries dormant only and directed between rows with shielded sprayer.

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Herbicide Mode of Action & Classification

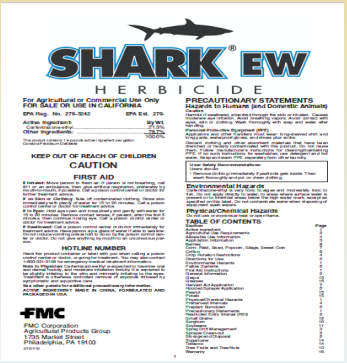
- PPG or Protox Inhibitor

  Triazalone **[14]**

  Carfentrazone-ethyl : **Aim® or Shark®**

  Vineyard & Orchards 3-day PHI

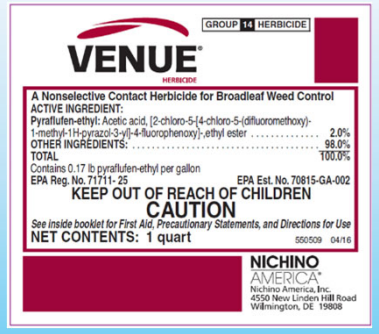
  Strawberries and Brambles 3-day PHI



  Pyraflufen-ethyl : **Venue®**

  Vineyard & Orchards 0-day PHI

  - ✓Post-emergence with no soil activity or uptake, rapid microbial breakdown.
  - ✓Selective broadleaf control
  - ✓Contact herbicide: Rapid foliar absorption with leaf translocation (15-minutes).
  - ✓Use with a non-ionic surfactant NIS or COC.
  - ✓Apply directed with a hooded sprayer.



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Venue Herbicide Observations
University of Maryland CMREC Upper Marlboro Facility
R. David Myers

UNIVERSITY OF MARYLAND EXTENSION

Late Season Venue Application - August 26, 2013
Visual Rating 2WAT – September 9, 2013

Visual Evaluation Venue 4.0 ozs/acre 20gpa with NIS 8.0 ozs/100 gal verses a no-spray control.

Poor 60%
Fair 70%
Good 80%
Very Good 90%
Excellent 100%

Notes: 70-80% (Suppression) 90-100% (Season Control)

Perennial Weeds	
Horsenettle	80%
Plantain, Buckhorn	60%
Dock	70%
Greenbriar	80%
Bindweed, Field	80%
Smartweed	80%
Mulberry	70%
Annual Weeds	
Morningglory	100%
Lambsquarter	100%
Pigweed	100%
Bed Straw	60%
Spurge	100%
Henbit	60%

Notes: No injury to grapes or fruit trees
Moderate bramble injury with directed spray, but quick recovery.

GROUP 14 HERBICIDE

VENUE®

HERBICIDE

A Nonselective Contact Herbicide for Broadleaf Weed Control

ACTIVE INGREDIENT:

Pyraflufen-ethyl: Acetic acid, [2-chloro-5-[4-chloro-5-(difluoromethoxy)-1-methyl-1H-pyrazol-3-yl]-4-fluorophenoxy]-,ethyl ester	2.0%
OTHER INGREDIENTS:	98.0%
TOTAL	100.0%

Contains 0.17 lb pyraflufen-ethyl per gallon

EPA Reg. No. 71711- 25 EPA Est. No. 70815-GA-002

KEEP OUT OF REACH OF CHILDREN

CAUTION

See inside booklet for First Aid, Precautionary Statements, and Directions for Use

NET CONTENTS: 1 quart 550509 04/16

NICHINO AMERICA®
Nichino America, Inc.
4550 New Linden Hill Road
Wilmington, DE 19808

Bearing and Nonbearing - Grape, Olive, Pome Fruits (Crop Group 11-10), Pomegranate, Stone Fruits (Crop Group 12), Tree Nuts (Crop Group 14 Plus Pistachio)

Application	Pest	Rate/Acre	Maximum Applications Per Year
Postharvest Dormant Prebloom	Sucker Management	3.0 to 4.0 fl oz/acre	Do not exceed 2 applications per season for this use.
In-Season	Listed Broadleaf Weeds	2.0 to 4.0 fl oz/acre	Do not exceed a combined total of 2 applications per season for these uses.
	Sucker Management	3.0 to 4.0 fl oz/acre	

Herbicide Mode of Action & Classification

- PPG or Protox Inhibitor

  Triazalone **[14]**

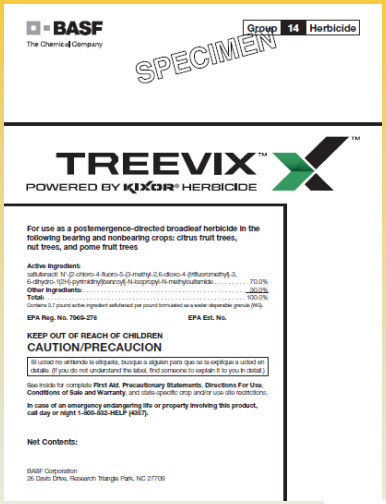
  Saflufenacil : **Treevix®**

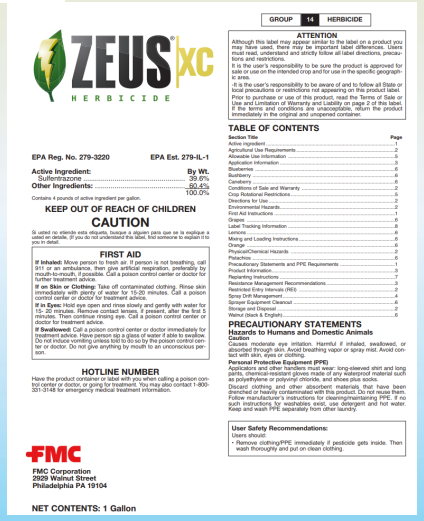
  Apples & Pears only, 0-day PHI

  Sulfentrazone: **Zeus XC®**

  Small Fruit 3-years established

  - ✓Post-emergence weed control with root activity and seasonal persistence.
  - ✓Burndown broadleaf control.
  - ✓Contact herbicide: Rapid foliar absorption with leaf translocation (15-minutes).
  - ✓Use with MSO, AMS or UAN.
  - ✓Avoid contact with fruit & foliage & follow label drift management guidelines.


BASF
The Chemical Company
Group 14 Herbicide
SPECIMEN
TREEVIX™
POWERED BY KIXOR® HERBICIDE
For use as a postemergence-directed broadleaf herbicide in the following bearing and nonbearing crops: citrus fruit trees, nut trees, and pome fruit trees
Active Ingredient:
saflufenacil: N'-[2-chloro-4-fluoro-5-[3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydro-1(2H)-pyrimidinyl]benzoyl]-N-isopropyl-N-methylsulfamide 70.0%
Other Ingredients: 30.0%
Total: 100.0%
Contains 0.7 pound active ingredient saflufenacil per pound formulated as a water-dispersible granule (WG).
EPA Reg. No. 7969-276
EPA Est. No.
KEEP OUT OF REACH OF CHILDREN
CAUTION/PRECAUCION
Si usted no entiende esta etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)
See Inside for complete First Aid, Precautionary Statements, Directions For Use, Conditions of Sale and Warranty, and state-specific crop and/or use site restrictions.
In case of an emergency endangering life or property involving this product, call day or night 1-800-832-HELP (4357).
Net Contents:
BASF Corporation
26 Davis Drive, Research Triangle Park, NC 27709


ZEUS XC
HERBICIDE
GROUP 14 HERBICIDE
ATTENTION
TABLE OF CONTENTS
EPA Reg. No. 279-3220
EPA Est. 279-IL-1
Active Ingredient: By Wt.
Sulfentrazone 39.6%
Other Ingredients: 60.4%
100.0%
Contains 4 pounds of active ingredient per gallon.
KEEP OUT OF REACH OF CHILDREN
CAUTION
FIRST AID
HOTLINE NUMBER
PRECAUTIONARY STATEMENTS
Hazards to Humans and Domestic Animals
Personal Protective Equipment (PPE)
User Safety Recommendations:
FMC
FMC Corporation
2929 Walnut Street
Philadelphia PA 19104
NET CONTENTS: 1 Gallon

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Herbicide Mode of Action & Classification

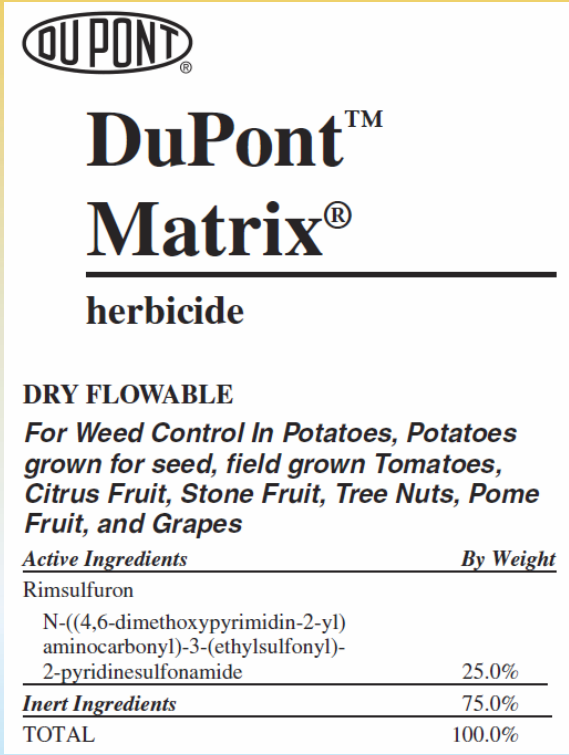
- Amino-Acid Acetolactate Synthase (ALS) Inhibitors

Sulfonyl-Ureas (SU's) **[2]**

Rimsulfuron: Matrix®

1-year established vineyards & orchards
14-day PHI

- ✓ Pre and Post control of selected grasses & broadleaves
- ✓ 4.0 ounces/acre - 1 application per year
- ✓ 2-3 month activity crop rotation. restrictions.
- ✓ *Bioassay Required.*



DUPONT®

DuPont™ Matrix®

herbicide

DRY FLOWABLE

For Weed Control In Potatoes, Potatoes grown for seed, field grown Tomatoes, Citrus Fruit, Stone Fruit, Tree Nuts, Pome Fruit, and Grapes

Active Ingredients	*By Weight*
Rimsulfuron N-((4,6-dimethoxypyrimidin-2-yl) aminocarbonyl)-3-(ethylsulfonyl)-2-pyridinesulfonamide	25.0%
Inert Ingredients	75.0%
TOTAL	100.0%

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Herbicide Mode of Action & Classification

- Cellulose Biosynthesis Inhibitors

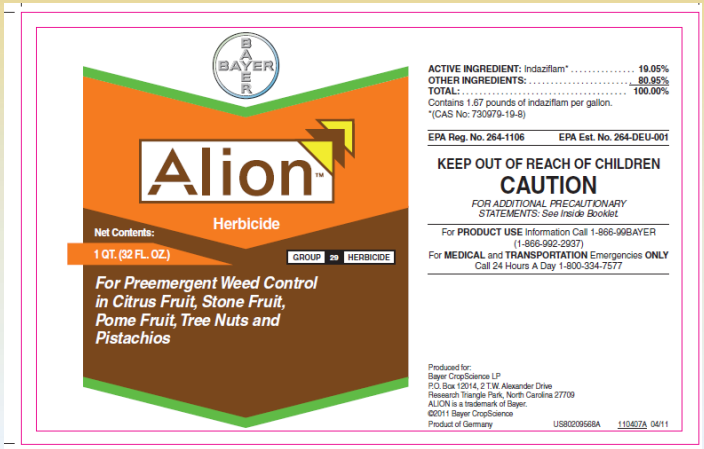
  Triazolocarboxamides **[29]**

  Indfaziflam: Alion®

  3-year established orchards

  14-day PHI

  - ✓ Preemergence control of selected grasses & broadleaves
  - ✓ 1.0 ounces/acre application 3.0 ounces per year maximum.
  - ✓ 2-year crop rotation restriction.
  - ✓ Apply to bare soil surface not in proximity to water.
  - ✓ Toxic to fish.
  - ✓ Avoid green trunk, fruit, branch & root contact.



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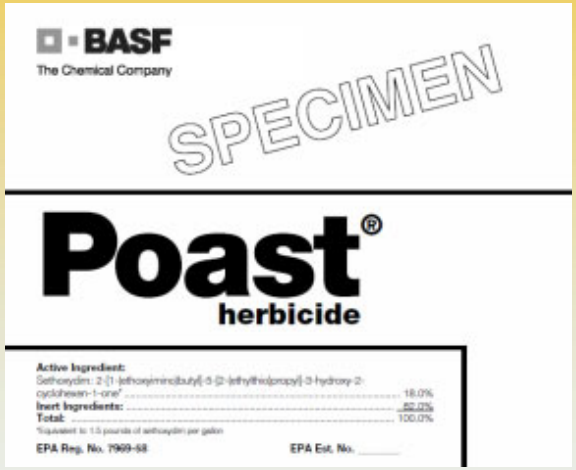
Herbicide Mode of Action & Classification

- Lipid Synthesis Inhibitor:

  Inhibits Acetyl-CoA Carboxylase



Cyclohexandiones **[1]**

Sethoxydim: Poast®

All Fruit 14-50 day PHI.

- ✓Post-emergence with no soil activity or uptake
- ✓**Controls grasses only**
- ✓Primarily leaf uptake – rapidly translocates to growing points
- ✓Use with crop oil concentrate (COC)

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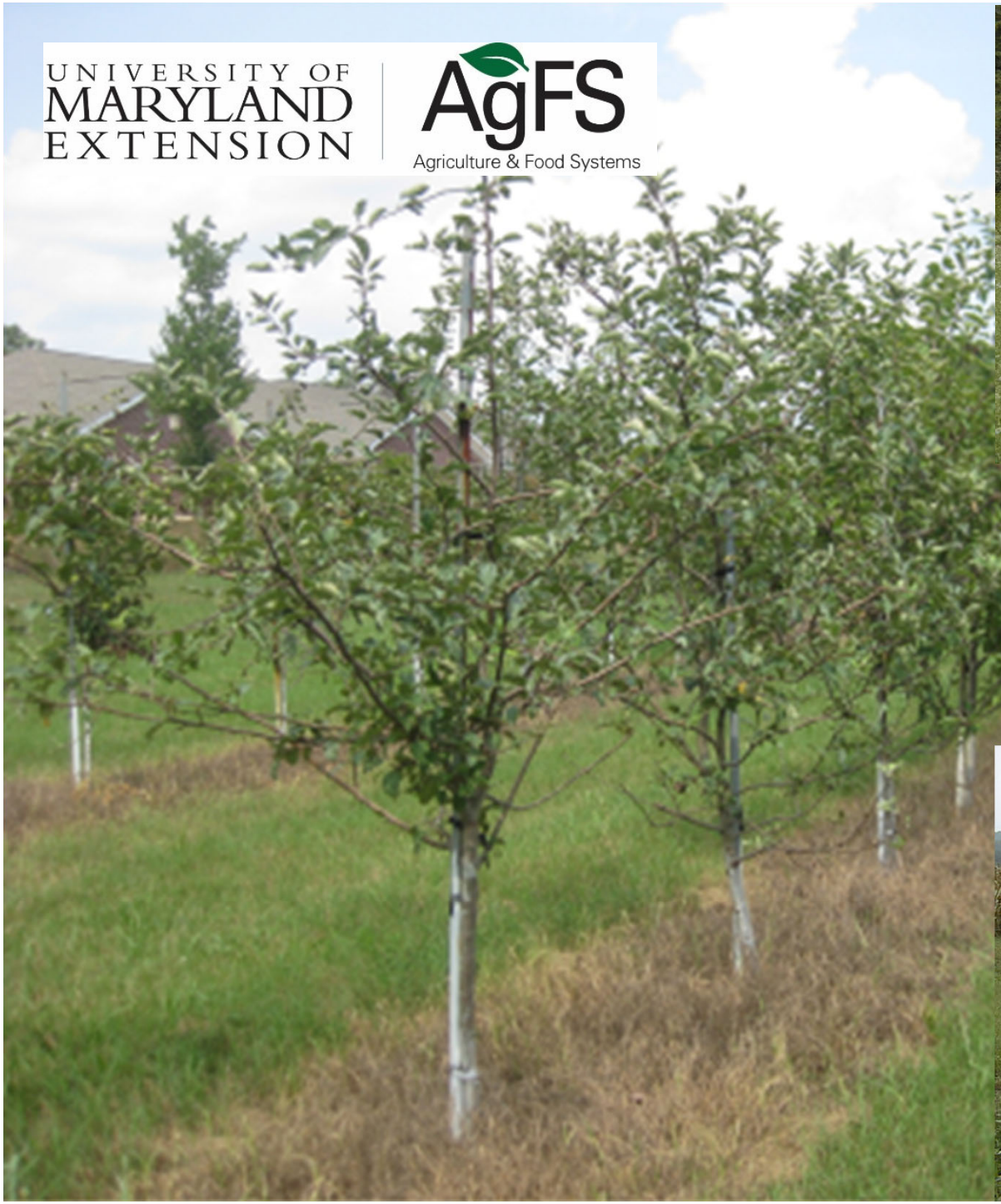
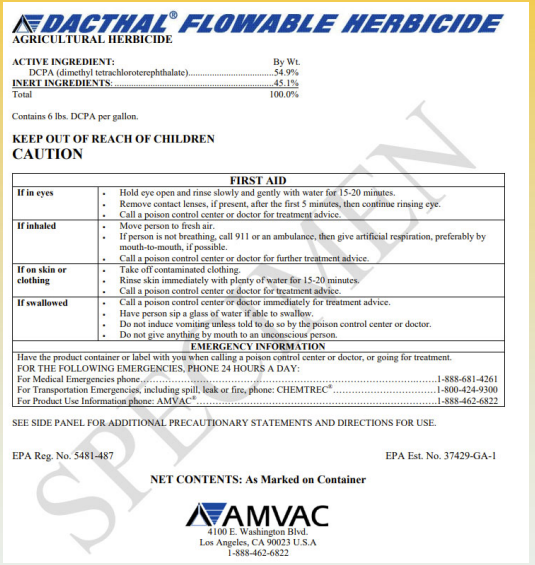
Agriculture & Food Systems



Herbicide Mode of Action & Classification

- Microtubule Assembly Inhibition



DACTHAL® FLOWABLE HERBICIDE
AGRICULTURAL HERBICIDE

ACTIVE INGREDIENT:	By Wt.
DCPA (dimethyl tetrachloroterephthalate)	54.9%
INERT INGREDIENTS:	45.1%
Total	100.0%

Contains 6 lbs. DCPA per gallon.

KEEP OUT OF REACH OF CHILDREN
CAUTION

FIRST AID	
If in eyes	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If swallowed	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.

EMERGENCY INFORMATION

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.
FOR THE FOLLOWING EMERGENCIES, PHONE 24 HOURS A DAY:
For Medical Emergencies phone.....1-888-681-4261
For Transportation Emergencies, including spill, leak or fire, phone: CHEMTREC®.....1-800-424-9300
For Product Use Information phone: AMVAC®.....1-888-462-6822

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS AND DIRECTIONS FOR USE.

EPA Reg. No. 5481-487 EPA Est. No. 37429-GA-1

NET CONTENTS: As Marked on Container

AMVAC
4100 E. Washington Blvd.
Los Angeles, CA 90023 U.S.A
1-888-462-6822

SPECIMEN

Chlorinated benzoic acids **[3]**

DCPA (chlorothal-dimethyl): Dacthal®

Strawberries Only

- ✓Pre and Post Emergence.
- ✓Apply at to new and established strawberry plantings, Early Spring Dormant or Fall.
- ✓**Do not apply from First Bloom to Harvest.**

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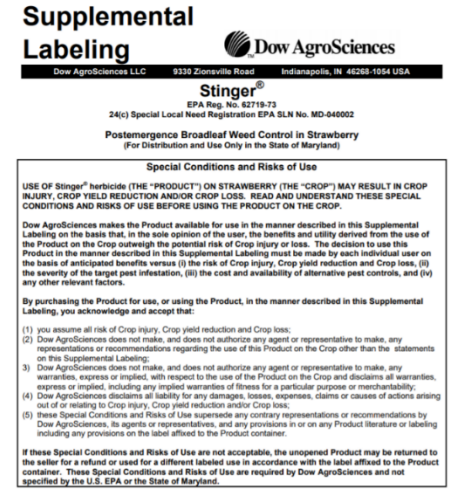
Herbicide Mode of Action & Classification

- **Growth Regulators**
  Pyridines **[4]**
  Clopyralid: Stinger®
  Strawberries Only with 24c Label


Supplemental Labeling
Dow AgroSciences
Dow AgroSciences LLC 9330 Zionsville Road Indianapolis, IN 46268-1054 USA
Stinger®
EPA Reg. No. 62719-73
24(c) Special Local Need Registration EPA SLN No. MD-040002
Postemergence Broadleaf Weed Control in Strawberry
(For Distribution and Use Only in the State of Maryland)
Special Conditions and Risks of Use
USE OF Stinger® herbicide (THE "PRODUCT") ON STRAWBERRY (THE "CROP") MAY RESULT IN CROP INJURY, CROP YIELD REDUCTION AND/OR CROP LOSS. READ AND UNDERSTAND THESE SPECIAL CONDITIONS AND RISKS OF USE BEFORE USING THE PRODUCT ON THE CROP.
Dow AgroSciences makes the Product available for use in the manner described in this Supplemental Labeling on the basis that, in the sole opinion of the user, the benefits and utility derived from the use of the Product on the Crop outweigh the potential risk of Crop injury or loss. The decision to use this Product in the manner described in this Supplemental Labeling must be made by each individual user on the basis of anticipated benefits versus (i) the risk of Crop injury, Crop yield reduction and Crop loss, (ii) the severity of the target pest infestation, (iii) the cost and availability of alternative pest controls, and (iv) any other relevant factors.
By purchasing the Product for use, or using the Product, in the manner described in this Supplemental Labeling, you acknowledge and accept that:
(1) you assume all risk of Crop injury, Crop yield reduction and Crop loss;
(2) Dow AgroSciences does not make, and does not authorize any agent or representative to make, any representations or recommendations regarding the use of this Product on the Crop other than the statements on this Supplemental Labeling;
3) Dow AgroSciences does not make, and does not authorize any agent or representative to make, any warranties, express or implied, with respect to the use of the Product on the Crop and disclaims all warranties, express or implied, including any implied warranties of fitness for a particular purpose or merchantability;
(4) Dow AgroSciences disclaims all liability for any damages, losses, expenses, claims or causes of actions arising out of or relating to Crop injury, Crop yield reduction and/or Crop loss;
(5) these Special Conditions and Risks of Use supersede any contrary representations or recommendations by Dow AgroSciences, its agents or representatives, and any provisions in or on any Product literature or labeling including any provisions on the label affixed to the Product container.
If these Special Conditions and Risks of Use are not acceptable, the unopened Product may be returned to the seller for a refund or used for a different labeled use in accordance with the label affixed to the Product container. These Special Conditions and Risks of Use are required by Dow AgroSciences and not specified by the U.S. EPA or the State of Maryland.

- ✓**Apply Post Harvest and Early Spring.**
- ✓**Do not mix with other herbicides.**
- ✓**Do not apply within 6-hours of rainfall.**
- ✓**Controls: Thistles, nightshade, dock, groundsel, ragweed, jimsonweed, cockleburs, clovers, prickly lettuce, sorrel, vetch and others.**

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Pasture Herbicides
Post Emergence Broadleaf Control

- **Growth Regulators: Abnormal Growth Response**

Phenoxy Acetic Acids **[4]**

2,4-D: 2,4-D Amine®

Orchards and Strawberries

Post-emergence with 1-4 weeks of soil activity.

- ✓Strawberry Matted Row Bed Renovation – Apply 2,4-D after fruiting, wait 7-days then mow to crown. Then cultivate beds to 12” width.
- ✓Foliar & root uptake translocates in the xylem & phloem.
- ✓Controls broadleaves only.
- ✓Dormant Orchard applications.

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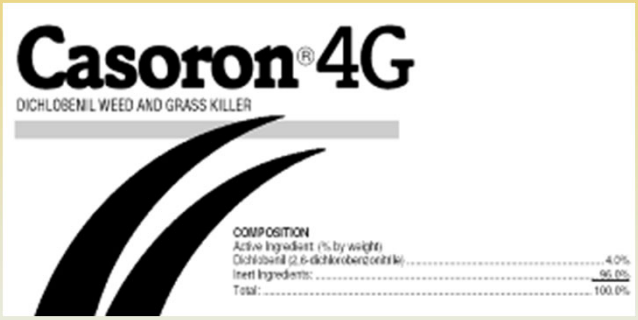
Herbicide Mode of Action & Classification

- Cellulose Biosynthesis Inhibitor: Acts Primarily at Actively Dividing Meristems – Roots Tips & Growing Points

Benzonitrile **[20]**

Dichlobenil: Casoron®4G

or Microencapsulated



Orchards, Vineyards Blueberries and Brambles

Pre-emergence with 2-6 months of soil activity.

- ✓Controls broadleaves & grasses equally.
- ✓Very little leaching – 4G has high vapor potential.
- ✓Absorbed primarily through the roots translocated readily via the xylem – rapid growth inhibition.
- ✓**Apply before rainfall or shallowly incorporate.**

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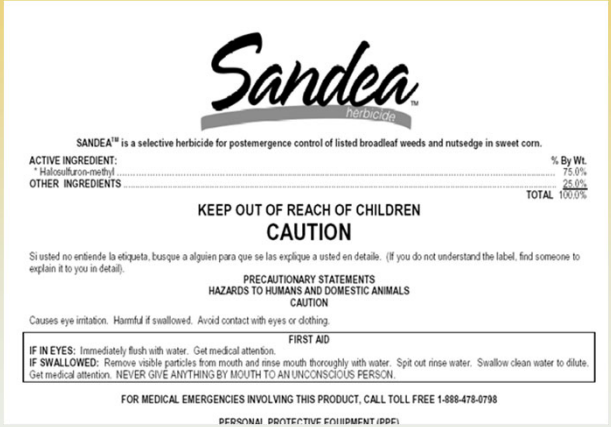
Herbicide Mode of Action & Classification

- Amino-Acid Acetolactate Synthase (ALS) Inhibitors


Sandea herbicide

SANDEA™ is a selective herbicide for postemergence control of listed broadleaf weeds and nutsedge in sweet corn.

ACTIVE INGREDIENT:	% By Wt.
* Halosulfuron-methyl	75.0%
OTHER INGREDIENTS	25.0%
TOTAL	100.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se las explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail).

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Causes eye irritation. Harmful if swallowed. Avoid contact with eyes or clothing.

FIRST AID

IF IN EYES: Immediately flush with water. Get medical attention.
IF SWALLOWED: Remove visible particles from mouth and rinse mouth thoroughly with water. Spit out rinse water. Swallow clean water to dilute. Get medical attention. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

FOR MEDICAL EMERGENCIES INVOLVING THIS PRODUCT, CALL TOLL FREE 1-888-478-0798

PERSONAL PROTECTIVE EQUIPMENT (PPE)

<u>Sulfonyl-Ureas (SU's)</u> **[2]**

Halsulfuron-Methyl: Sandea®

Brambles and Blueberries

- ✓ Pre and Post control of selected grasses & broadleaves
- ✓ 2.0 ounces/acre - 1 application per year
- ✓ Controls nutsedge 3-5 leaf stage.
- ✓ Do not apply directly to new canes.
- ✓ Apply directed and shielded to both sides of row.

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Regulating Pesticides Home
Reregistration Home
About Reregistration
Product Reregistration
Public Participation
Reregistration Status
Progress & Status Reports

Implementation of Risk Mitigation Measures for Soil Fumigant Pesticides

Current as of December 2010

Soil Fumigant Toolbox

Welcome to the Soil Fumigant Toolbox which provides training, outreach, and other resource materials for applicators and handlers, communities, state and local agencies, and others interested in understanding and implementing the current requirements for safe use of soil fumigants. Learn what's new in the toolbox.

WHAT CAN I FIND ON THESE WEB PAGES?


RESTRICTED USE PESTICIDE
Due to high acute inhalation toxicity and carcinogenicity.
For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.
Dow AgroSciences
Telone® C-35
Soil Fungicide and Nematicide
®Trademark of Dow AgroSciences LLC
A multi-purpose liquid fumigant for preplant treatment of soil to control plant parasitic nematodes, symphylans and to help manage certain soil borne diseases in cropland.
Not for use in greenhouses or other enclosed areas and not for use in drip or other chemigation applications.
Active Ingredients:
1,3-dichloropropene 63.4%
chloropicrin 34.7%
Other Ingredients 1.9%
Total 100.0%
One gallon of Telone C-35 weighs about 11.2 lb at 70°F. Contains 7.10 lb of 1,3-dichloropropene and 3.89 lb of chloropicrin per gallon.
EPA Reg. No. 62719-302
RESTRICTED USE PESTICIDE
Dow AgroSciences
Telone® II
Soil Fumigant
A multi-purpose liquid fumigant for preplant treatment of soil to control plant parasitic nematodes, symphylans and to help manage certain soil borne diseases in cropland
Not for use in greenhouses or other enclosed areas.
Not for formulation or manufacturing use. Do not formulate this product into other products.
Active Ingredient: (by weight)
1,3-dichloropropene 97.5%
Other Ingredients 2.5%
Total 100.0%
1 gallon of Telone II weighs 10.15 lb at 70°F. Contains 9.85 lb of 1,3-dichloropropene per gallon.
EPA Reg. No. 62719-32
RESTRICTED USE PESTICIDE
Dow AgroSciences
Telone® C-17
Soil Fungicide and Nematicide
A multi-purpose liquid fumigant for preplant treatment of soil to control plant parasitic nematodes, symphylans and to help manage certain soil borne diseases in cropland.
Not for use in greenhouses or other enclosed areas.
Active Ingredients:
1,3-dichloropropene 81.2%
chloropicrin 16.5%
Other Ingredients 2.3%
Total 100.0%
One gallon of Telone C-17 weighs about 10.6 lb at 70°F. Contains 8.6 lb of 1,3-dichloropropene and 1.75 lb of chloropicrin per gallon.
EPA Reg. No. 62719-12
RESTRICTED USE PESTICIDE
Dow AgroSciences
Telone® EC
Soil Fumigant
A liquid fumigant for preplant treatment of soil to control plant parasitic nematodes and certain other soil pests in cropland using drip irrigation systems only.
Active Ingredient: (by weight)
1,3-dichloropropene 93.6%
Other Ingredients 6.4%
Total 100.0%
1 gallon of Telone EC weighs 10.1 lb at 70°F. Contains 9.45 lb of 1,3-dichloropropene per gallon.
EPA Reg. No. 62719-321
RESTRICTED USE PESTICIDE
Dow AgroSciences
InLine®
Soil Fungicide and Nematicide
A multi-purpose liquid fumigant for the preplant treatment of soil to control nematodes and symphylans and to manage certain soil borne diseases in cropland using drip irrigation systems only.
Active Ingredients:
1,3-dichloropropene 60.8%
chloropicrin 33.3%
Other Ingredients 5.9%
Total 100.0%
One gallon of InLine weighs about 11.2 lb and contains 6.81 lb of 1,3-dichloropropene and 3.73 lb of chloropicrin.
EPA Reg. No. 62719-348
RESTRICTED USE PESTICIDE
DUE TO ACUTE TOXICITY AND CARCINOGENICITY
For retail sale to and use by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification.
Pic-Clor 60 EC
A multi-purpose liquid fumigant to be used in drip irrigation systems only for pre-plant treatment of soil to control nematodes, symphylans, wireworms and certain soil-borne diseases in cropland.
ACTIVE INGREDIENTS:
Chloropicrin 56.7%
1,3-Dichloropropene 37.1%
OTHER INGREDIENTS: 6.2%
TOTAL: 100.0%
One gallon of Pic-Clor 60 EC weighs about 11.81 lbs./gal. at 20° C.
Contains 4.49 pounds of 1,3-Dichloropropene and 6.73 pounds of Chloropicrin per gallon.
KEEP OUT OF REACH OF CHILDREN
DANGER
PELIGRO
POISON
IN ALL CASES OF OVEREXPOSURE, GET MEDICAL ATTENTION IMMEDIATELY.
TAKE PERSON TO A DOCTOR OR TO AN EMERGENCY TREATMENT FACILITY.
SPECIMEN LABEL
RESTRICTED USE PESTICIDE
Due to inhalation exposure to humans.
For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.
PALADIN®
Soil Fumigant
For control or suppression of weeds, soil-borne plant pathogens and nematodes in soils to be planted with vegetables (tomatoes, peppers, eggplants), cucurbit crops (cucumber, squash and melons), strawberries, blueberries, field-grown ornamentals, and forest nursery stock where plastic tarp is used for fumigation. For application via raised bed shank injection and broadcast/flat fume methods only.
ACTIVE INGREDIENT:
Dimethyl disulfide 98.8%
OTHER INGREDIENTS: 1.2%
TOTAL: 100.0%
One gallon weighs 8.85 lbs. at 68° F
Keep Out of Reach of Children
WARNING / AVISO
DOMINUS
Biopesticide For Agricultural Soil Treatment Use
A Broad Spectrum Pre-Plant Soil Biofumigant For The Control Of Certain Soil-Borne Fungi, Nematodes, Weeds And Insects
ACTIVE INGREDIENT:
Allyl isothiocyanate 96.3%
OTHER INGREDIENTS: 3.7%
TOTAL: 100.0%
Contains 8.19 lbs. active ingredient (allyl isothiocyanate) per gallon. This product weighs 8.5 lbs. per gallon.
KEEP OUT OF REACH OF CHILDREN
DANGER / PELIGRO
ISAGRO USA
Manufactured for:
Isagro USA, Inc.
430 Davis Drive, Suite 240
Morrisville, NC 27560
VAPAM HL
SOIL FUMIGANT
A SOIL FUMIGANT FOR ALL CROPS
KEEP OUT OF REACH OF CHILDREN
DANGER - PELIGRO
AMVAC
K-PAM® HL
A SOIL FUMIGANT SOLUTION FOR ALL CROPS
KEEP OUT OF REACH OF CHILDREN
DANGER — PELIGRO
AMVAC
CHAMPON
DAZITOL CONCENTRATE
For Agricultural and General Soil Treatment Use
SOIL TREATMENT
TO CONTROL AND REPEL
LISTED INSECTS AND FUNGI IN SOIL
♦ NEMATODES ♦ CERTAIN FUNGI ♦ PRE-EMERGENT WEEDS
Refer to "Soil Treatment Uses & Pests Controlled" in "Directions for Use" section for an exact listing of species
Active Ingredients
Capsaicin and related Capsaicinoids* 0.42%
Allyl Isothiocyanate** 3.70%
Other Ingredients 95.88%
Total 100.00%
* Oleoresin of Capsicum
** From Essential Oil of Mustard
KEEP OUT OF REACH OF CHILDREN
CAUTION
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http://annearundel.umd.edu/files/Plasticulture_Production.doc

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Plasticulture Production Method for Specialty Vegetables

The ethnic and specialty vegetables and herbs investigated at the Central Maryland Research and Education Center, Upper Marlboro Facility 1999-2007 were species that typically are cultivated in the tropical regions of Africa, South America, India and the Caribbean. Hence, these vegetables thrive under hot growing conditions that occur in Maryland from the first week of June through the end of August, with the majority of mature fruit produced in the long hot days of July. The Maryland study has proven that the plasticulture techniques which utilize black plastic covered raised beds and trickle irrigation greatly enhanced production success for these specialty vegetables. With the utilization of plasticulture specialty vegetables and herbs may be successfully planted in mid May to provide a range of harvest dates from Mid June to September, as revealed for the twenty-seven vegetable species or varieties examined. Refer to the production report entitled: *Ethnic Vegetable Production Trials on a Plasticulture System for the Development of an Ethnic Food Market in Southern Maryland*, (Myers and Tubene et al 2001).

The plasticulture system approach requires a conventionally tilled field, that allows a bed maker to gather soil into 4-6" raised bed that are 30" wide on 5' centers. Bed making and the laying of plastic may be combined in one pass when the desired height of the bed is not required to exceed 4 inches. However, it is recommended that for higher beds, make a pass to initially form the bed followed by a second pass to lay the plastic and install the trickle irrigation tube. The raised plasticulture bed should be firmly crowned to shed water with a plastic to soil contact that is free of soil voids. Thus allowing solar heat to be effectively transferred to deeper reaches of the soil promoting faster and uniform early growth. Trickle irrigation systems require clean water that is filtered to avoid emitter plugging. Ponds or dedicated irrigation wells are required to irrigate fields that are larger than one acre in order to provide sufficient water volume. Trickle irrigation tubing is capable of high water volume delivery at a low operating pressure range from 5-12 pounds per square inch. For more information concerning the design and operation of trickle irrigation obtain a copy of the University of Maryland Extension Bulletin 356 *Trickle Irrigation for Cut Flowers, Vegetables, and Small Fruits*, (Ross 1997).

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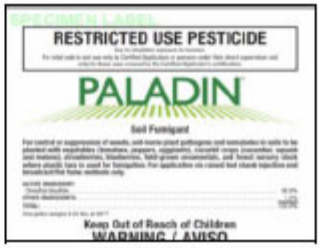
Fumigant Product Update

Fumigant	Disease	Nematodes	Weeds	Soil Injected	Chemigation
TELONE II (DP-Dichloropropene 97.5%)	yes	yes	maybe	yes	no
TELONE C-17 (DP 81% + CP-Chloropicrin 16.5%)	yes	yes	maybe	yes	no
TELONE C-35/PicChlor (DP 63.4% + CP 34.7%)	yes	yes	yes	yes	no
TELONE EC (DP 93.6%)	yes	yes	maybe	yes	yes
IN-LINE (TELONE DP 60.8% + CP 33.3 %)	yes	yes	maybe	yes	yes
VAPAM HL (Metam Sodium 42%)	yes	yes	yes	yes	yes
K-PAM HL (Metam Potassium 54%)	yes	yes	yes	yes	yes
PALADIN (Dimethyl Disulfide 98.8%)	yes	yes	yes	yes	no
DAZITOL (Capsaicin .42% + Alyll Isothiocanate 3.7%)	maybe	maybe	no	yes	yes



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Dave Myers
Extension Educator, Agriculture
myersrd@umd.edu

Tree Fruit Herbicides

Apples, Apricots, Cherries, Nectarines, Peaches, Pears and Plums

- Pre-Weed Emergence: Diuron (Karmax), Napropamide (Devrinol), Norflurazon (Solicam Apples and Pears), Oryzalin (Surflan), Oxyfluorfen (Goal), Pronamide (Kerb), Simazine (Princep), Terbacil (Sinbar), Pendimethalin (Prowl), Flumioxazin (Chateau directed)
- Post-Weed Emergence: Fluazifop (Fusilade), Sethoxydim (Poast), 2,4-D, Clopyralid (Stinger Peaches Plums Cherries),

Herbicides for Blueberries, Grapes and Brambles

- Pre-Weed Emergence: Napropamide (Devrinol), Norflurazon (Solicam Blueberries and Brambles only), Oryzalin (Surflan), Pronamide (Kerb), Simazine (Princep), Terbacil (Sinbar Blueberries and Brambles Only), Dichlobenil (Casoron), Pendimethalin (Prowl Grapes and Brambles)
- Post-Weed Emergence: Fluazifop (Fusilade), Sethoxydim (Poast), Clethodim (Select), 2,4-D Clopyralid (Stinger Blueberry Only pre or post flower 30-day PHI), Halsulfuron (Sandea row middle), Paraquat (Gramoxone row middle), Flumioxazin (Chateau row middle), Carfentrazon (Aim row middle), Sulfentrazone (Spartan or Zeus)

Strawberry Herbicides

- Pre-Weed Emergence: DCPA (Dacthal), Napropamide (Devrinol), Terbacil (Sinbar), Pendimethalin (Prowl H_2O with caution row middle & renovation), Simazine (Princep renovation)
- Post-Weed Emergence: Fluazifop (Fusilade), Sethoxydim (Poast), Clethodim (Select), 2,4-D (renovation), Clopyralid (Stinger pre flower), Paraquat (Gramoxone row middle), Flumioxazin (Chateau row middle), Carfentrazon (Aim row middle), Sulfentrazone (Spartan or Zeus renovation)